

Clean copy of the final allowed claims

1. A computer implemented method for annotating the surface of a computer model having a set of computer model vertices and computer model polygons, wherein the annotations comprise line segments and are specified as geometry in the form of a set of annotation vertices and annotation edges that connect the vertices, comprising the steps of:
 - a) Selecting an annotation edge that connects a pair of the annotation vertices;
 - b) projecting the pair of annotation vertices of the edge onto the surface of the computer model to obtain projected vertices;
 - c) selecting a cutting plane between the pair of the projected vertices in which the cutting plane is selected by one of i) the pair of projected vertices and a midpoint of the relevant annotation edge and ii) the pair of projected vertices and an average of normals to surface polygons that contain the pair of projected vertices;
 - d) cutting the surface of the model with the cutting plane, the plane intersecting the model on a cutting line;
 - e) reconnecting the pair of projected vertices on the surface of the model by identifying points of intersection of the cutting plane with edges of the surface polygons, connecting one of the projected vertices to the nearest intersection point on the surface polygon edges, connecting the intersection points on each successive polygon that was intersected till the surface polygon on which the second projected vertex lies and then connecting a last intersection point to the second projected vertex, to produce the projection of the annotation edge on the computer model; and
 - e) repeating steps b) to e) for each annotation edge in the annotation specified.

2. A method as in claim 1, where if the projected vertices and the midpoint of the annotation edge are collinear, the cutting plane is defined by containing the two projected vertices and a normal to the surface of the model at one or more of the projected vertices.

3. A method as in claim 1, where the projected vertices are projected on the surface within a tolerance by snapping.

5. A computer system that annotates a surface of a computer model having a set of computer model vertices and computer model polygons, wherein the annotations comprise line segments and are specified as geometry in the form of a set of vertices and edges that connect the vertices, comprising:

a processor to execute a program of instructions stored in a memory of the computer;

the memory to store a program of instructions for performing a method for annotating a surface of a computer model and the data defining a geometric model;

a graphics processor and a display to display an image of the computer model and the annotation;

means for selecting an annotation edge that connects a pair of the annotation vertices;

means for projecting the pair of annotation vertices of the edge onto the surface of the computer model to obtain projected vertices;

means for selecting a cutting plane between the pair of the projected vertices in which the cutting plane is selected by one of i) the pair of projected vertices and a midpoint of the

relevant annotation edge and ii) the pair of projected vertices and an average of normals to surface polygons that contain the pair of projected vertices;

means for cutting the surface of the model with the plane, the plane intersecting the model on a cutting line;

means for reconnecting the pair of projected vertices on the surface of the model by identifying points of intersection of the cutting plane with edges of the surface polygons, connecting one of the projected vertices to the nearest intersection point on the surface polygon edges, connecting the intersection points on each successive polygon that was intersected till the surface polygon on which the second projected vertex lies and then connecting a last intersection point to the second projected vertex, to produce the projection of the annotation edge on the computer model; and

means for repeating the process for each annotation edge in the annotation specified.

6. A computer product having a program comprising instructions which when executed on a computer perform a process for annotating the surface of a computer model having a set of computer model vertices and computer model polygons, wherein the annotations comprise line segments and are specified as geometry in the form of a set of vertices and edges that connect the vertices, comprising the steps of:

- a) Selecting an annotation edge that connects a pair of the annotation vertices;
- b) projecting the pair of annotation vertices of the edge onto the surface of the computer model to obtain projected vertices;
- c) selecting a cutting plane between the pair of the projected vertices in which the cutting plane is selected by one of i) the pair of projected vertices and a midpoint of the

relevant annotation edge and ii) the pair of projected vertices and an average of normals to surface polygons that contain the pair of projected vertices;

d) cutting the surface of the model with the cutting plane, the plane intersecting the model on a cutting line;

e) reconnecting the pair of projected vertices on the surface of the model by identifying points of intersection of the cutting plane with edges of the surface polygons, connecting one of the projected vertices to the nearest intersection point on the surface polygon edges, connecting the intersection points on each successive polygon that was intersected till the surface polygon on which the second projected vertex lies and then connecting a last intersection point to the second projected vertex, to produce the projection of the annotation edge on the computer model; and

e) repeating steps b) to e) for each annotation edge in the annotation specified.

7. A computer implemented method for annotating the surface of a computer model having a set of computer model vertices and computer model polygons, wherein the annotations comprise line segments and are specified as geometry in the form of a set of annotation vertices and annotation edges that connect the vertices, comprising the steps of:

a) Selecting an annotation edge that connects a pair of the annotation vertices;

b) projecting the pair of annotation vertices of the edge onto a surface of the computer model to obtain projected vertices, wherein said step of projecting annotation vertices comprises snapping a projected vertex to one of a nearest surface vertex and a nearest surface edge when said nearest surface vertex or nearest surface edge is within a tolerance value, and

said projected vertex remaining where it is projected when said nearest surface vertex or nearest surface edge is not within said tolerance value;

c) selecting a cutting plane between the pair of the projected vertices in which the cutting plane is selected by one of i) the pair of projected vertices and a midpoint of the relevant annotation edge and ii) the pair of projected vertices and an average of normals to surface polygons that contain the pair of projected vertices;

d) cutting the surface of the model with the cutting plane, the plane intersecting the model on a cutting line;

e) reconnecting the pair of projected vertices on the surface of the model by identifying points of intersection of the cutting plane with edges of the surface polygons, connecting one of the projected vertices to the nearest intersection point on the surface polygon edges, connecting the intersection points on each successive polygon that was intersected till the surface polygon on which the second projected vertex lies and then connecting a last intersection point to the second projected vertex, to produce the projection of the annotation edge on the computer model; and

e) repeating steps b) to e) for each annotation edge in the annotation specified.